Material Safety Data Sheet

Version 1.2 MSDS Number 300000000071
Revision Date 11/23/2003 Print Date 01/14/2004

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Hexafluoroethane
Chemical formula	:	C2F6
Synonyms	:	Hexafluoroethane (R116), Halocarbon 116
Product Use Description	:	General Industrial
Company	:	Air Products and Chemicals,Inc 7201 Hamilton Blvd. Allentown, PA 18195-1501
Telephone	:	800-345-3148
Emergency telephone number	:	800-523-9374 USA 01-610-481-7711 International

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Concentration (Volume)
Hexafluoroethane (R116)	76-16-4	100 %

Concentration is nominal. For the exact product composition, please refer to Air Products technical specifications.

3. HAZARDS IDENTIFICATION

Emergency Overview

Can cause rapid suffocation.
Compressed liquefied gas.
Avoid breathing gas.
Direct contact with liquid can cause frostbite.
Self contained breathing apparatus (SCBA) may be required.

Potential Health Effects

Inhalation	:	Inhalation of high concentrations may also cause mild central nervous system depression and heartbeat irregularities. In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness.Victim may not be aware of asphyxiation. Asphyxiation may bring about unconsciousness without warning and so rapidly that victim may be unable to protect themselves.
Eye contact	:	Contact with liquid may cause cold burns/frost bite.
Skin contact	:	Contact with liquid may cause cold burns/frost bite.
Ingestion	:	Ingestion is not considered a potential route of exposure.

Chronic Health Hazard : Not applicable.

Exposure Guidelines

Primary Routes of Entry : Inhalation

Target Organs : None.

Symptoms : Exposure to oxygen deficient atmosphere may cause the following symptoms: Dizziness. Salivation. Nausea. Vomiting. Loss of mobility/consciousness.

Aggravated Medical Condition

Persons with preexisting cardiac or central nervous system disorders may have increased susceptibility to the effects of overexposure.

4. FIRST AID MEASURES

General advice : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Eye contact : In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Keep eye wide open while rinsing. Seek medical advice.

Skin contact : Wash frost-bitten areas with plenty of water. Do not remove clothing. Cover wound with sterile dressing.

Ingestion : Ingestion is not considered a potential route of exposure.

Inhalation : Move to fresh air. If breathing is irregular or stopped, administer artificial respiration. In case of shortness of breath, give oxygen.

Notes to physician

Treatment : This material may make the heart more susceptible to arrhythmias. Catecholamines such as epinephrine and drugs having similar effects should be reserved for specific indications and used only with extreme caution.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : All known extinguishing media can be used.

Specific hazards : Exposure to high temperatures may yield toxic by-products which may be corrosive in the presence of moisture. Upon exposure to intense heat or flame, cylinder will vent rapidly and or rupture violently. Product is nonflammable and does not support combustion. Move away from container and cool with water from a protected position. If possible, stop flow of product. Keep adjacent cylinders cool by spraying with large amounts of water until the fire burns itself out. Most cylinders are designed to vent contents when exposed to elevated temperatures.

Special protective equipment for fire-fighters	:	Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Evacuate personnel to safe areas. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ventilate the area. Monitor oxygen level.
Environmental precautions	:	Should not be released into the environment. Do not discharge into any place where its accumulation could be dangerous. Prevent further leakage or spillage. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
Methods for cleaning up	:	Ventilate the area.
Additional advice	:	If possible, stop flow of product. Increase ventilation to the release area and monitor oxygen level. If leak is from cylinder or cylinder valve, call the Air Products emergency telephone number. If the leak is in the user's system, close the cylinder valve, safely vent the pressure, and purge with an inert gas before attempting repairs.

7. HANDLING AND STORAGE

Handling

Only experienced and properly instructed persons should handle compressed gases. Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not allow storage area temperature to exceed 50°C (122°F). Before using the product, determine its identity by reading the label. Know and understand the properties and hazards of the product before use. When doubt exists as to the correct handling procedure for a particular gas, contact the supplier. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Use an adjustable strap wrench to remove over-tight or rusted caps. Before connecting the container, check the complete gas system for suitability, particularly for pressure rating and materials. Before connecting the container for use, ensure that back feed from the system into the container is prevented. Ensure the complete gas system is compatible for pressure rating and materials of construction. Ensure the complete gas system has been checked for leaks before use. Employ suitable pressure regulating devices on all containers when the gas is being emitted to systems with lower pressure rating than that of the container. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing a leak to occur. Open valve slowly. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Close valve after each use and when empty. Replace outlet caps or plugs and container caps as soon as container is disconnected from equipment. Do not subject containers to abnormal mechanical shocks which may cause damage to their valve or safety devices. Never attempt to lift a cylinder by its valve protection cap or guard. Always use backflow protective device in piping. When returning cylinder install valve outlet cap or plug leak tight. Never use direct flame or electrical heating devices to raise the pressure of a container. Containers should not be subjected to temperatures above 50°C (122°F). Prolonged periods of cold temperature below -30°C (-20°F) should be avoided. Never attempt to increase liquid withdrawal rate by pressurizing the container without first checking with the supplier. Never permit liquefied gas to become trapped in parts of the system as this may

result in hydraulic rupture.

Storage

Full containers should be stored so that oldest stock is used first. Containers should be stored in the vertical position and properly secured to prevent toppling. The container valves should be tightly closed and where appropriate valve outlets should be capped or plugged. Container valve guards or caps should be in place. Observe all regulations and local requirements regarding storage of containers. Stored containers should be periodically checked for general condition and leakage. Protect containers stored in the open against rusting and extremes of weather. Containers should not be stored in conditions likely to encourage corrosion. Containers should be stored in a purpose build compound which should be well ventilated, preferably in the open air. Keep containers tightly closed in a cool, well-ventilated place. Store containers in location free from fire risk and away from sources of heat and ignition. Full and empty cylinders should be segregated. Do not allow storage temperature to exceed 50°C (122°F). Return empty containers in a timely manner.

Technical measures/Precautions

Containers should be segregated in the storage area according to the various categories (e.g. flammable, toxic, etc.) and in accordance with local regulations. Keep away from combustible material.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Personal protective equipment

Respiratory protection	:	Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmosphere. Air purifying respirators will not provide protection. Users of breathing apparatus must be trained.
Hand protection	:	Sturdy work gloves are recommended for handling cylinders. The breakthrough time of the selected glove(s) must be greater than the intended use period.
Eye protection	:	Safety glasses recommended when handling cylinders.
Skin and body protection	:	Safety shoes are recommended when handling cylinders.
Special instructions for protection and hygiene	:	Ensure adequate ventilation, especially in confined areas.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form	:	Compressed gas.
Color	:	Colorless gas
Odor	:	No odor warning properties.
Molecular Weight	:	138.01 g/mol
Relative vapor density	:	4.765 (air = 1)
Relative density	:	1.23 (water = 1)

Vapor pressure	:	435.10 psig (30.00 bar) at 68 °F (20 °C)
Density at 70 °F (21 °C)	:	0.362 lb/ft3 (0.0058 g/cm3) Note: (as vapor)
Specific Volume at 70 °F (21 °C)	:	2.77 ft3/lb (0.1729 m3/kg)
Boiling point/range	:	-109 °F (-78.2 °C)
Critical temperature	:	67 °F (19.7 °C)
Melting point/range	:	-149 °F (-100.7 °C)
Water solubility	:	No data available.

10. STABILITY AND REACTIVITY

Stability	:	Stable under normal conditions.
Conditions to avoid	:	Alkali and alkaline earth metals - powdered aluminum, zinc, etc.
Hazardous reactions	:	Thermal decomposition yields toxic products that can be corrosive in the presence of moisture.

11. TOXICOLOGICAL INFORMATION

Chronic Health Hazard

Rats exposed to 20.7% Hexafluoroethane, 23 hours per day for 37 weeks, exhibited no adverse clinical signs. Growth was slightly depressed. Hematology, serum chemistry and pathology evaluations revealed no compound-related changes. Rats that were exposed to 0.3% Hexafluoroethane for 30 minutes and observed for 14 days exhibited an increase in daily urine volume and increased creatinine. Fluoride ion excretion was also increased four days after exposure. Histopathology revealed reversible kidney changes. Dogs that were exposed to 60% Hexafluoroethane did not exhibit cardiac sensitization. Dogs that were exposed to 20% Hexafluoroethane for five minutes and then challenged with epinephrine did not exhibit cardiac sensitization. Anesthetized guinea pigs, cats and dogs exposed to 20% Hexafluoroethane exhibited a slightly increased likelihood of a cardiac sensitization response to infused epinephrine. Rats and guinea pigs exposed to 12.1% Hexafluoroethane, 23 hours per day for ten days, exhibited no adverse clinical signs. Growth was slightly depressed. Necropsy revealed slight lung and liver changes. This material was not mutagenic in a bacterial assay.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Aquatic toxicity	:	No data available.
Toxicity to other organisms	:	No data available.

Persistence and degradability

Mobility : No data available.

Bioaccumulation : No data available.

Further information

This product has no known eco-toxicological effects. Not covered by the 'Montreal Protocol'.

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products : Return unused product in orginal cylinder to supplier. Contact supplier if guidance is required.

Contaminated packaging : Return cylinder to supplier.

14. TRANSPORT INFORMATION

CFR

Proper shipping name : Refrigerant gas R 116
Class : 2.2
UN/ID No. : UN2193

IATA

Proper shipping name : Refrigerant gas R 116
Class : 2.2
UN/ID No. : UN2193

IMDG

Proper shipping name : REFRIGERANT GAS R 116
Class : 2.2
UN/ID No. : UN2193

CTC

Proper shipping name : REFRIGERANT GAS R 116
Class : 2.2
UN/ID No. : UN2193

Further Information

Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.

15. REGULATORY INFORMATION

OSHA Hazard Communication Standard (29 CFR 1910.1200) Hazard Class(es)
Compressed Gas

Country	Regulatory list	Notification
USA	TSCA	Included on Inventory.

EU	EINECS	Included on Inventory.
Canada	DSL	Included on Inventory.
Australia	AICS	Included on Inventory.
Japan	ENCS	Included on Inventory.
South Korea	ECL	Included on Inventory.
China	SEPA	Included on Inventory.
Philippines	PICCS	Included on Inventory.

EPA SARA Title III Section 312 (40 CFR 370) Hazard Classification:
Sudden Release of Pressure Hazard

US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)
This product does not contain any chemicals known to State of California to cause cancer, birth defects or any other harm.

16. OTHER INFORMATION

NFPA Rating

Health : 2
Fire : 0
Instability : 0

HMIS Rating

Health : 1
Flammability : 0
Physical hazard : 0

Prepared by : Air Products and Chemicals, Inc. Global EH&S Product Safety Department

For additional information, please visit our Product Stewardship web site at
http//www.airproducts.com/productstewardship/